Pose estimation with Open Pose

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OpenPose

To use the portable version of OpenPose for Windows (Open Pose Demo) without compiling or writing any C++/Phyton code pay attention to the following steps:

1. **Important Requirement**. You should use OpenPose in a machine with a Nvidia GPU. In fact, the software uses the CUDA cores present in these graphics card.
2. In this zip forder there is the version we used for this project. For further information on the latest OpenPose versions check the following link: https://github.com/CMU-Perceptual-Computing-Lab/openpose/releases.
3. Follow the `Instructions.txt` file inside the downloaded zip file to download the models required by OpenPose. **Note** In the case this process doesn't work you can use the models.zip folder in this folder, copying all its content("face","hand","pose" folders) in the openpose/models folder.
4. Then, you can run OpenPose from the PowerShell command-line by following the instructions.

(for more information visit the website: https://github.com/CMU-Perceptual-Computing-Lab/openpose)

Unity - SiMuove!_v3

1. Once you have uploaded the video and obtained the JSON files in output from Open Pose, import the folder into ***Assets/JSON Data*** in the Unity project.
   The Pose Output Format used is the BODY_25, allowing to extract the two dimensional position for each of the 25 point.
2. Copy the path of the *"JSON Data"* folder into the *"JSON File Path"* voice present into the *"IKControl"* Script Section
3. **Note** that the avatar used in the project, already has the Animation Rigging. In fact, in order to perform the inverse kinematics and overcome the lack of data for performing the 3D reconstruction, the introducing of a set of constraints between the bones becomes fundamental. That's why if another avatar wants to be used, this is a precaution that must be taken into account, making sure to click the cog settings icon of the Layer and enable the IK Pass checkbox in the **Animator window**.
4. Start the animation pressing "*L*" (after the running button at the top of the screen), the script should allow automatically to find the best scale for adapting the animation to the avatar, and at the same time to close the gaps due to the missing data in the frames extracted by Open Pose.